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Geodiversity in Fife

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Public interest in Geology has never been greater. Today the media takes full advantage of new developments in science, using modern technology and animations to convey geological observations and theories to audiences of all ages. 'geoHeritage Fife' was set up to focus on the local rocks of Fife as a way of getting people involved with the rocks on their doorsteps.

At the beginning of the 20th century the Director of the Geological Survey, Sir Archibald Geikie, commented that:

> *If I were asked to select a region in the British Isles where geology could best be practically taught by constant appeals to evidence in the field, I would with little hesitation recommend the East of Fife as peculiarly adapted for such a purpose.*

His support resulted in the foundation of a degree in Geology at the University of St Andrews and, ever since, the unrivalled local outcrops have been used to train undergraduates.

In 2000, local geologists Richard Batchelor and Rosalind Garton, together with adult education students from the University of St Andrews Open Association, decided it was time to make the interpretation of the outstanding local geology more accessible, both for Fife residents and visitors. With a rich diversity of rocks, from fossils and folds to lavas and volcanic necks, and a coastline of nearly 200km, Fife is well placed to demonstrate the variety of geological features in eastern Scotland (Fig. 1).

To this end, geoHeritage Fife was set up as a registered charity (SC032509) and a fully constituted society. It publicises Fife's geological heritage, provides educational resources in geology, and promotes geotourism in Fife. It currently has 38 members, who participate in field excursions, suggest new itineraries, and 'test-walk' new geological trail leaflets. Its Chair, Richard Batchelor, is Honorary Research Fellow in the School of Earth and Environmental Sciences at the University of St Andrews. Its Secretary, Rosalind Garton, has been Geology Tutor to the Open Association for more than 30 years, and uses the unrivalled sections in Fife for teaching her popular classes. As the local Local Geodiversity Sites organisation (formerly RIGS), geoHeritage Fife also has a duty to inform the local planning authority about new geologically important sites. Contentious planning applications are referred to the group for assessment and comment (Figs 2, 3, 4 and 5, *all overleaf*)

To date, geoHeritage Fife has produced ten leaflets explaining aspects of geology for St Andrews, St Monans, Kingsbarns, Kinghorn and Kirkcaldy, Aberdour, Dura Den, Wormit, Norman's Law, Holy Trinity Church in St Andrews, and Historical geoscientists at St Andrews. It has built a geological wall in St Andrews (consisting of rocks representative of Fife's geology) and a stone cairn in Ladybank (incorporating examples of glacially derived stones), created a Jurassic Garden in St Andrews, and erected plaques in St Andrews to two famous geologists — mineralogist Matthew Heddle and palaeontologist Charles Lapworth.

The foreshore near St Andrews has examples of folded rocks, plant and shell fossils, remains of a volcano and the fossilised tracks of a giant water scorpion. St Monans has a similar assemblage of geological structures. The area around Kinghorn and Kirkcaldy shows good examples of igneous rocks, which flowed over and intruded sedimentary rocks. There are also rich assemblages of fossils, and both thrust and normal faulting (with breccias) can be inspected. The shore at Wormit in North Fife shows good examples of Devonian volcanic activity, with lava flows, volcanic conglomerates, inter-lava sediments

Location map of geoHeritage Fife sites:

1 St Andrews Geological Trail
2 Geological Wall in St Andrews
3 Historical Geoscientists at St Andrews
4 Jurassic Garden
5 Holy Trinity Church, St Andrews
6 Kingsbarns Geological Trail
7 St Monans Geological Trail
8 Kinghorn — Kirkcaldy Geological Trail
9 Aberdour Geological Trail
10 Geology of Ladybank — record in stone
11 Dura Den Geological Trail
12 Norman's Law —a geological perspective of views from the summit
13 Wormit shore Geological Trail
14 Lomond Hills

Figure 2 Rock and Spindle, the remnants of a Carboniferous volcano near St Andrews.

Figure 4 Saddleback (plunging) anticline, St Andrews.

Figure 3 View to St Andrews from the Maiden Rock.

Figure 5 Geological Wall, St Andrews.

Figure 6 Thrusts near Kinghor.

Figure 7 Volcanic conglomerate (Devonian), Wormit.

(some with evidence of fossil algal mats), a late-stage micro-granite intrusion and a substantial glacial erratic of Dalradian schist — geoHeritage Fife also organises excursions to explore this wonderful local geodiversity (Figs 6 and 7, *previous page*; Figs 8, 9, 10 and 11, *this page*).

Figure 8 Felsite intrusion (Devonian), Wormit.

Figure 9 Arthropleura tracks, Boarhills.

In 2009, a new departure for geoHeritage Fife was the winning of grants worth £7,700 to commission a plaster cast of the fossil trackway of a giant arthropod that was considered at risk from erosion and vandalism. Part of the cast is now on display in the Museum of the University of St Andrews (Figs 12 and 13).

Figure 10 Dolerite sill, Kirkcaldy.

Figure 11 Fossil crinoids in limestone, Kirkcaldy.

*Figure 12 Trackway of giant water scorpion '*Hibbertopterus*', and right, Figure 13 Plaster cast of part of the trackway, MUSA, St Andrews.*

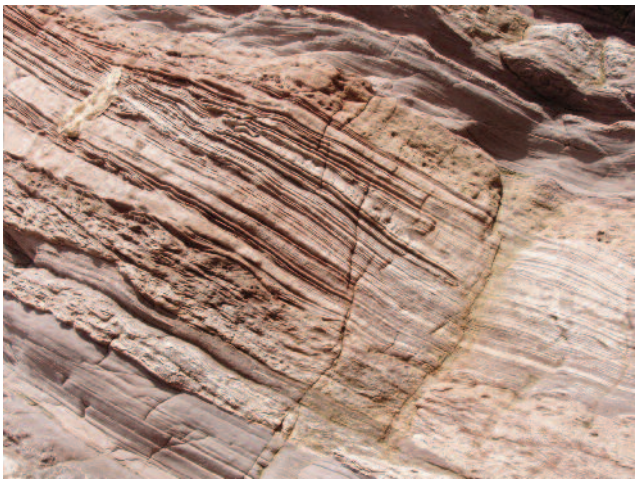

Figure 14 Textures in sandstone, Kirkcaldy.

Then in 2010, it organised a photographic competition to encourage the public to observe, artistically through the camera lens, Fife's geological heritage. The competition was judged by professional photographers and elicited an amazing 150 entries! (Figs 14 and 15)

Two years later geoHeritage Fife joined the 'Living Lomonds Landscape Partnership' (LLLP), a consortium of local groups and charities in Fife, and the consortium put in a bid to the Heritage Lottery Fund for a three-year multidisciplinary project to explore the natural, cultural and built environment of the Lomond Hills west Fife. The bid was successful, and £1.7M was awarded to the consortium, led by Fife Coast and Countryside Trust. geoHeritage Fife's share of this grant was £11.5k and we also raised match funding (see Acknowledgements). These funds were used to do fieldwork for and in the writing of four geological trail leaflets describing the features of the East Lomond, West Lomond and Bishop Hills, and the Building Stones of Falkland, a historical and picturesque village (Figs 16, *below*; 17 and 18, *opposite*).

The group continues to thrive and new ideas and requests flow in both from its members and from the public. A leaflet on the *Building Stones of St Andrews* is currently in draft , and trail leaflets for other geological sections in Fife are planned.

Given our success and the enthusiasm of our members geoHeritage Fife encourages others to explore their home areas and be prepared to extol the virtues of the local geology to make it accessible to the public, giving advice on successful approaches and, particularly, on potential sources of funding for projects such as these.

Figure 15 Basalt columns, Leslie (Photograph: Gilroy).

Acknowledgements

Over the years geoHeritage Fife has been financially supported by Fife Council, Scottish Natural Heritage, the Curry Fund of the Geologists' Association, The Royal Society, Scottish Enterprise Fife, The Skene Group, Kinburn (St Andrews) Charitable Trust, Edinburgh Geological Society, and St Andrews Community Trust, as well as by members' subscriptions and donations. The Heritage Lottery Fund contributed the £11.5k matching fund described above.

Figure 16 View of Bishop Hill (left) and the twin peaks of the East (centre) and West (right) Lomond hill. Both peaks are formed by dolerite intrusions. The ledge to the right of the West Lomond is formed by an outcrop of the Midland Valley Sill.

Figure 17 Limestone quarry, Bishop Hill.

Figure 18 Stone wall in Falkland, with a mixture of igneous and sedimentary stones.